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ABSTRACT

Variables that correlate with scores on the National Certifying Examination (NCE) for Physician's Assistants (PAs) were investigated. It is noted that NCE scores represent professional entry-level performance for PAs and that identification of variables related to PA performance may promote the development of standardized selection criteria. The following variables were assessed: science grade point average, nonscience grade point average, overall grade point average, Scholastic Aptitude Test-Math, and Scholastic Aptitude Test-Verbal. NCE scores that were assessed were as follows: multiple choice questions, patient management problems--data gathering, patient management problems--management and therapy, clinical skills problems, and composite. The study sample consisted of 59 graduates of the Physician's Assistant Program of the Medical College of Georgia. No significant correlations were found between the independent variables and the NCE scores. An extensive review of studies concerning the prediction of success of applicants to allied health education programs as well as medical school and professional programs is included. (SW)

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CORRELATES OF PHYSICIAN'S ASSISTANT PERFORMANCE

A Project in Applied Education

Submitted to

the Faculty of the School of Education

Augusta College

In Partial Fulfillment of Requirements

for the

Degree of Master of Education

by

Patrick T. Walters

November, 1983

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Correlates of Physician's Assistant Performance

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ABSTRACT

This study was carried out in an attempt to identify those variables which correlate well with those scores which represent professional entry level performance among Physician's Assistants. This correlational study identified five independent measures (scores) which were applied to five dependent scores on the National Certifying Examination (NCE) for Physician's Assistants, which delineates professional entry level performance. The subjects were graduates of the Medical College of Georgia School of Allied Health Physician's Assistant Program, Augusta, Georgia, from the classes graduating from 1976 to 1980.

The statistical analysis suggests that the independent variables (scores) identified do not correlate significantly with the five dependent variables (scores) of the NCE. It is, therefore, concluded that establishing any predictive equation would not be warranted.

CORRELATES OF PHYSICIAN'S ASSISTANT PERFORMANCE

CHAPTER I

INTRODUCTION

Context of the Problem

The Physician's Assistant (PA) profession started in 1966 at Duke University, School of Medicine at Durham, North Carolina. The PA Profession has offered an Examination of Entry Level Clinical Competence since 1973. As far as this researcher could ascertain in literature search, PA educators have made no efforts to correlate pre-professional measures with the scores on the National Commission on Certification of Physician's Assistants' (NCE) National Certifying Examination for Primary Care Physician's Assistants. Discussions with four PA Program directors from the southeast and midwest United States revealed no well-defined correlates with the NCE scores. There were differences of opinion between these same directors in the correlates that they found between pre-professional measures and grades within the different PA Programs. No one has defined any correlates between pre-professional measures and NCE scores.

There have been several individual regression equations developed. These were designed for use within individual PA programs in an attempt to predict which students would complete a particular PA Program. No one has published

correlations between pre-professional measures and NCE scores. The studies completed for prediction of success within individual programs boast statistical significance, but they were few in number.

Ladson and Major (1978) found that students with higher high school ranking and some college education performed better in the didactic phase of a PA Program and that students without such educational advantages tended to catch up during the clinical phase. Bruhn, Bunce, and Greaser (1978) found that by utilizing several variables they were able to make some predictions concerning exit Grade Point Average (GPA).

Broski, Schimpfhauser, and Cook (1977), and Leiken and Cunningham (1980) attempted to utilize the Allied Health Professions Admissions Test (AHPAT) as a predictor of professional competence. Their data were conflicting in regards to the ability of the AHPAT to be utilized as a predictor of professional competence.

Pharris (1974) and Crovitz, Huse, and Lewis (1973) studied several variables for the prediction of performance of graduate PA's. Pharris found that some mathematical equations may be applied when selecting students, but did no work in correlations with NCE scores. Crovitz et al. found that scores on the Scholastic Aptitude Test were good predictors of academic success at the Duke University PA Program. They also found that personality measures such as the Minnesota Multiphasic Personality Index as well as

previous health care experience were of no value in predicting performance.

Statement of the Problem

To attain excellence within the profession, PA's must identify those variables which correlate well with the NCE scores. The correlates then can be used as one variable in the PA selection process. Quality of the PA graduates is measured by the NCE scores attained.

The previously cited studies show no significant correlates of entry level performance of PA's, and there has been little progress in utilizing available data to define such correlates. As professionals, educators, and selectors of future peers, there exists a need to undertake a significant study to determine those variables which correlated with the NCE scores. This research paper is an attempt to assist the profession in the selection process of future PA's.

A significant problem for the PA profession and PA educators has been in identifying those variables which correlated with NCE scores in general, as well as those specific measures within individual PA Programs. Those correlates which were identified as having statistical significance with the NCE scores in general should take priority because the NCE scores represent the professional entry level performance for PA's.

The purpose of this study was to determine which of the many variables readily available to most PA Programs most

closely correlate with NCE scores. Assuming that an adequate number of variables could be identified and operationally defined, it then became the task of this researcher to test the significance of the variables in correlation. The independent variables to be studied were: Science GPA (SCGPA), Non-science GPA (NSCGPA), Overall GPA (OAGPA), Scholastic Aptitude Test Math (SATM), and Scholastic Aptitude Test Verbal (SATV). The dependent variables to be studied were: Patient Management Problem - Data Gathering (PMPDG), Patient Management Problem - Management/Therapy (PMPMT), Multiple Choice Questions (MCQ), Clinical Skills Problem (CSP), and Composite score (COMP). The variables were studied utilizing the Pearson *r* correlation to examine the relationships between each set of independent and dependent variables.

Significance of the Study

Identification of those variables deemed applicable to PA performance may enable the PA profession to standardize selection criteria. Additionally, predictive equations extrapolated from the data gathered may prove more useful in the selection of future students for PA Programs.

Correlation of variables with the NCE scores may enable the PA profession to further educational research by application of its results to other Allied Health Professions.

CHAPTER II

SURVEY OF RELATED LITERATURE

Although the Physician's Assistant profession is a young profession, PA educators have attempted to identify those variables which correlated with performance within PA training programs. These studies centered upon successful completion of the particular PA Program in question, but correlations of readily available variables were not applied to the scores attained by the graduates of these same PA Programs on the National Commission on Certification of Physician's Assistants' National Certifying Examination for Primary Care Physician's Assistants.

Discussions on the telephone with PA Program directors from Baylor College of Medicine, Bowman Gray School of Medicine, the University of Kentucky College of Allied Health Professions, and the Medical College of Georgia School of Allied Health, as well as the Director of the National Commission on Certification of Physician's Assistants pertaining to the utilization of selection process data were conducted. The problem of how to select students from the available applicant pool generated interest and some possible solutions. Some directors stated that they utilized "hard" data such as pre-professional Grade Point Averages (GPA), both science and non-science; scores on the Scholastic Aptitude Test (SAT), both math and verbal; scores from reading ability and comprehension tests

(usually the Nelson-Denny Reading Test); and some high school GPA and rankings. Other directors stated that they utilized such "soft" criteria as the scores attained on personality indices, including the Minnesota Multiphasic Personality Inventory (MMPI), the California Psychological Inventory (CPI), and the Myers-Briggs Type Indicator (MB TI). Other "soft" criteria were: evidence of prior medical experience such as Licensed Practical Nurse, Registered Nurse, military medical corpsman, Medical Technologists, and various technicians or therapists in medical related fields; references; interviews; and letters from the applicant explaining his/her reasons for wishing to become a PA. All program directors stated that they utilized the interview as one variable in the selection process.

It was apparent that there were many variables available for consideration in a correlational research study of performance on the National Commission on Certification of Physician's Assistants' National Certifying Examination for Primary Care Physician's Assistants. It was also apparent from a review of the related literature that attempts to predict success have been undertaken, but those studies did not show any statistically significant relationship within a program to warrant generalization.

The PA profession was not the only medical or allied health profession to have difficulty in the selection of its students. PA's were not the only profession utilizing many of the same "hard" data available for the evaluation of

applicants. Broski, Schimpfhauser, and Cook (1977) at Ohio State University, at Columbus, Ohio, attempted to correlate 11 variables as predictors of success in the School of Allied Health Professions for the first year, upper division students in various health programs. They utilized the five subscores on the Allied Health Professionals Admissions Test (AHPAT), the five subscores of the American College Testing Program, and the pre-professional GPA as correlates in predicting performance. Schimpfhauser and Broski (1976) had previously reported that pre-professional GPA generally served as the strongest variable in predicting first year grades in all allied health profession students based on their experience with the experimental form of the AHPAT.

In the 1977 study, Broski et al. utilized scores from 435 students attending Ohio State University between 1973 and 1975 in the Physical Therapy, Occupational Therapy, Medical Dietetics, and other professional courses with numbers too small to identify individually, for the statistical analysis.

The statistical analysis used was multiple regression. The equation was designed utilizing all 11 variables. The significance level of .05 was used. Broski et al. (1977) also found that the pre-professional GPA was the most significant single variable at the .001 level of significance. All other variables ranged from slightly above the .001 level to the .05 level of significance with the verbal of the AHPAT.

Leiken and Cunningham (1980) found that the AHPAT in combination with pre-professional GPA was a useful predictor of success in Allied Health Professional Programs at the University of New York at Stoney Brook. They applied a multiple regression equation to those two variables and found statistical significance at the .05 level or better using a one-tailed test with 152 students. The programs in which these students were enrolled were: Medical Technology, Physician Assistant, and Physical Therapy. Leiken and Cunningham criticized the data from Ohio State University for criticizing the AHPAT as a predictor of success within a training program. They stated that the AHPAT is quite valid as a predictor of success and that the authors from Ohio State University simply did not utilize all of the available data on hand to extrapolate the appropriate results.

Katzell (1977), from the Psychological Corporation, found that the AHPAT could facilitate the process of selection by identifying the most promising students from an applicant pool. Her 52-student sample was rather limited in sample size and was from various unspecified programs in Allied Health Professions from across the nation. The author employed multiple correlation correlates of the AHPAT and GPA's of students who had completed first year professional studies. Her data noted a statistical significance at the .05 level. She deduced from these statistics that the AHPAT was valid. She further stated

that since the validity of the test had been verified, the test could be utilized as a reasonable tool to predict success in an Allied Health Professional Program.

In most Allied Health Professional Programs, students have two or three phases of education. The first phase is generally termed the didactic phase. The second phase is termed the clinical phase, while the third phase, either the intership, externship, or preceptorship phase. Grades from each of these phases, or the overall GPA, can be utilized in correlational studies.

Some Allied Health Professionals utilize the interview technique as a significant tool to add to the data collected in the applicant's file for the evaluation of that applicant. The inclusion of such "soft" data is not unusual in many selection processes. Mann (1979) reviewed the interview techniques at the State University of New York at Buffalo over a three-year period utilizing structured versus non-structured interview techniques for the selection of occupational therapy students. Mann's hypothesis became: "There is a tendency among interviewers to score applicants higher or lower on the average than other interviewers" (pp. 235-236). He utilized an analysis of variance statistical design.

In reviewing scores from 1,043 interviews with occupational therapy students between 1977 and 1978, Mann found a wide variety of scores from different interviewers. The statistics from the 1,043 interviews represented three

interviews per applicant from 21 different interviewers. The results of 78.89 for the mean score, 11.21 for the mean standard deviation, 94.68 for the mean highest score, and 57.49 for the mean lowest score certainly revealed that the author was correct in his assumption that certain interviewers score higher or lower on the average than do other interviewers. Mann's table showed that the mean of one interviewer was 72.70, while another interviewer had a high mean score of 86.38. The lowest SD among the 21 interviewers was 4.77, while the highest SD was 20.56. Interestingly enough, none of the results was from the same individual interviewer. The most interesting statistic was that the mean score did not vary much after the more structured interview scoresheet was employed, but that the range between the lowest and highest scores narrowed considerably, as did the standard deviation.

The author suggested that with more experience utilizing the new, more structured interview scoresheet, the scores would become more consistent among the interviewers as a group, thus more reliable when applied to the entire application package. However, Mann did not present the significance level of the findings in the study.

Ford (1979) reviewed five studies of prediction of performance in occupational therapy at Colorado State University at Ft. Collins. She identified 16 independent variables and two dependent variables in her study of 72 occupational therapy students at Colorado State University.

She determined that the grade assigned to the student in Physical Disabilities Internship and overall GPA could be correlated with the 16 independent variables. The independent variables were all grades in core courses for occupational therapy students at Colorado State University.

Ford found that of the 16 independent variables, only one pair correlated significantly. She found that grades in a course in neurology held significance when correlated with internship success (grades).

Blaisdell and Gordon (1979) undertook a large task in attempting to construct a mathematical model which could be applied by many Allied Health Professional Schools to assist in the most difficult task of student selection. They also attempted to construct this formula to assure that only qualified students enter a program of professional study in Allied Health.

The authors completed a retrospective analysis of 126 students in 1972 who entered the Elizabethtown College, at Elizabethtown, Pennsylvania, Occupational Therapy Program. They identified 33 independent variables representing precollegiate information about the prospective students used to separate the students into two separate groups. These groups were: (1) those who would complete the program and (2) those who would withdraw. They then devised a linear combination of variables to distinguish between the groups. One stated drawback was that the formula was "cut

and dried" (p. 226), leaving no leeway in the classification of students.

The statistical analysis of the results revealed that the authors were able to predict successes 90% of the time, while at the same time predicting withdrawals 63% correctly. They reported a .84 correlation with first semester freshmen GPA and cumulative GPA (except freshmen). In "interest in the physical and life sciences" (p. 277), Blaisdell and Gordon identified statistical significance at the .005 level. The "support score" on the Survey of Interpersonal Values was at the .034 level. Thus, even when employing a rather large number of independent variables to predict success in an Allied Health Professional Program, the authors were no more accurate than were previous studies with the same goal.

Love, Holter, and Krall (1982), at West Virginia University, at Morgantown, West Virginia, identified four types of data commonly gathered to assess applicants to the Medical Technology Program. These four types of data included:

> (1) scores on aptitude or achievement tests; (2) grade point averages; (3) personal history or demographic characteristics (including letters of recommendation; and (4) results of personal interviews. (p. 186)

The authors obtained data from all applicants to the West Virginia University Medical Technology Program for review, as well as the records from all students who matriculated and who graduated from West Virginia University from

August 1972 through May 1980. This study was an attempt to test the validity of the utilization of the GPA as the hallmark for success. They correlated cumulative and science GPA's of the applicants on initial application to the Medical Technology Program at West Virginia University with both a comprehensive examination given at the completion of the course of study and the National Certifying Examination given by the Board of Registry for the medical technologist profession and cumulative and science GPA's of students after completion of the course of study with the same comprehensive examination and certifying examination. Love et al. (1982) had 303 complete sets of data from 313 applicants and 179 graduates. Of the 179 graduates, they had data available from 172 individuals who took the National Registry Examination.

The results of the study reveal 179 sets of complete data for the comprehensive examination portion of the study and 172 complete sets of data for the National Registry Examination. Love et al. (1982) found significant correlations at .005 for the portion of the 172 students who scored above 70% on both the comprehensive and National Registry Examinations and for whom there was complete data in all phases of the study. The correlations were between cumulative GPA at entry, science GPA at entry, and cumulative GPA at graduation. For those students for whom there were no National Registry Examination scores, but who scored above 70% on the comprehensive examination,

statistical significance was found at the .01 level when correlated with entry level cumulative GPA. This, however, was the only significant correlation. Scores on the National Registry Examination held significance at the .005 level only when correlated with both entry level science GPA and cumulative GPA at graduation.

The authors stated that although GPA's are useful tools in evaluating applicants, they should not be utilized as the major or sole determinant of accepting or rejecting students for their Medical Technology Program. Love et al. (1982) stated a need for further study in the area of evaluating other criteria for acceptance, such as recommendations and personal interviews to determine their roles in the selection process.

Brooks and Dietrich (1982) undertook a study to establish selection processes throughout Dietetic Internship Programs. They surveyed all accredited Dietetic Internship Programs with a 70% response rate. The authors failed to mention any statistical analysis of the variables they were able to identify as predictive of success in Dietetic Internships, but did list the components of the academic record utilized in the selection process.

The authors stated that of the 2,159 individuals undertaking the Registered Dietitian Examination, 548 were graduates of accredited Dietetic Internships. Eighty-nine percent of the 548 individuals passed the examination as

compared to an overall success rate of 85%. The authors stated:

> while internship graduates have been generally more successful in passing the Registered Dietitian Examination than those who qualified for testing by other routes, this failure rate in the midst of strong competition for placement is cause for concern among internship directors. (p. 355)

Dietitians are now attempting to evaluate selection criteria and predictive attributes of their students. As a result, another Health Profession has come to the point at which it must attempt to delineate the student who has attributes predictive of success in the Internship Program, as well as predictive of success on the Registered Dietitian Examination.

A review of literature from medical school admissions and predictive factors of success in medical school reveals volumes of available material. The following articles represent many of those articles published between 1955 and 1981 related to the general topic investigated by this researcher.

Wingard and Williamson (1973) published a review of 27 articles in medicine and other professions relating undergraduate grades to subsequent career performance. The authors stated in the abstract that there seemed to be little data on the topic at hand and that many career decisions in medicine were predicated on grades that depict little more than memory work by the student. They also stated that a clear need to "rethink the use of grades for

crucial career decisions and training grant awards seems to be equally evident" (p.311).

Grough and Hall (1975) examined 1,014 graduates and 47 dropouts from nine graduating classes of the University of California School of Medicine at San Francisco. They attempted to identify the variables which described and correlated to dropouts. They also attempted to identify those variables attributed to medical school success. The authors utilized correlational studies to describe these variables.

Grough and Hall found that there were 50 quantitative predictors. They were able to construct six predictive equations to forecast graduation from this list of 50 variables utilizing multiple regression analyses of as few as 6 independent variables and as many as 43 dependent variables. Statistical significance was found at the .01 level for each of the six equations.

The authors also stated that there was an academic dropout rate of 1.6% and a non-academic dropout rate of 3.8% in the total sample of 1,071. There were several combinations of variables offered as having promise in predicting the occurrence of dropout from the University of California at San Francisco. They also stated that since these findings represented a single school, judgement as to the reliability of generalization of their data was suspect until data from other schools could be examined.

Williams, Pengov, Sachs, Meleca, and Camiscioni (1977) of Ohio State University, at Columbus, Ohio, developed a computer-assisted admissions process which had been utilized since 1972 to assist the selections committee in evaluating applications for Medical School at Ohio State University. The computerized system utilized a regression equation of prediction with independent variables being: (1) GPA, (2) Medical College Admissions Test (MCAT), and (3) selected scores on the examinations by the National Board of Medical Examiners (NBME) in correlation with GPA at selected periods of time during course study at Ohio State University College of Medicine. The equation was revised and refined each year to adjust to changes in curriculum.

The authors reported multiple regression correlations ranging from the .44 level between the years 1967 and 1974. Multiple regression for the years 1967 to 1971 was reported at .49, and .45 for the years 1967 to 1973. The authors reported that the utilization of multiple regression analysis equation for prediction of success in medical school correlated well with GPA and MCAT scores when correlated with NBME scores and GPA during medical school with a sample size of 1,286 individuals.

The study conducted by Williams et al. (1977) indicated stability of the multiple regression analysis equation as well as its effectiveness in predicting student success. The admissions committee utilized the data from the computer

to enable the selections committee to spend more time on individual consideration of the most qualified applicants.

Cullen, Dohner, Peckham, Samson, and Schwarz (1980), at the University of Washington Medical School at Seattle, utilized a regression analysis to predict "First Quarter Test Scores" (p. 393) based on the new MCAT. Specifically, they tested the predictive ability or validity of the new MCAT as it related to the final examinations for the first quarter of medical school in "anatomy, histology, physiology, biochemistry, and 'ages of man'" (p. 393). The results indicated that the science assessment areas of chemistry and physics and the science problems subtest on the new MCAT were the most useful in predicting student performance. The skills analysis - quantitative and skills analysis - reading as well as the biology area of the science knowledge subtest on the new MCAT were the next most successful predictors of success when measured against the end of the quarter grades as previously mentioned.

Cullen et al. (1980) utilized statistics from the 175 entering freshmen at the University of Washington School of Medicine in 1978 as the population for the study. Three stepwise regression analyses were done to study the contribution of the new MCAT scores to the prediction of each end-of-quarter examination. The independent variables were the six new MCAT subtest scores alone; the six new MCAT scores plus Science GPA, Non-science GPA, and total GPA; the

Science GPA, Science Problems score (MCAT), Skills Analysis; and Reading (MCAT) and Skills Analysis, Quantitative.

The results of the study showed a significant correlation between chemistry, physics, and science problems subtests of the new MCAT and the science courses (anatomy, physiology, histology, and biochemistry). There was no significant correlation between any of the above subtests correlated at a significant level with the "ages of man" course. The significance level appeared to be chosen after the statistical analysis had been done. The conclusion drawn by the researchers was that the new MCAT "made a significant contribution to the prediction of success in the first quarter of medical school" (p. 398).

Friedman and Bakewell (1980) at the University of North Carolina School of Medicine at Chapel Hill investigated the predictive powers of the new MCAT at their institution utilizing an end-of-year comprehensive examination administered to 158 freshman medical students.

The authors conducted a multiple regression analysis utilizing the new MCAT scores, undergraduate GPA, Scholastic Aptitude scores, marital status, age, undergraduate major, parental education and income, hometown community size, average change in undergraduate GPA, highest undergraduate degree earned, and undergraduate science hours. The dependent variable was the three-day comprehensive examination covering the first year of the curriculum.

Three approaches were undertaken to the regression analysis: (1) all of the independent variables were entered simultaneously into a stepwise regression procedure to determine their relative predictive value; (2) all of the new MCAT scores were entered into a stepwise regression to determine their relative predictive value; and (3) all of the initial data was again entered and the stepwise regression was computed again. The results of the data analysis revealed that the new MCAT had a predictive ability on the order of 30%. The predictive ability of the new MCAT increased when the National Board of Medical Examiners' part one scores were entered into the stepwise regression equation. The science problems or the biology subtest scores were better predictors of first year examination scores than the five other subtests. The order of decreasing power of prediction was as follows: biology, science problems, and skills analysis - quantitative.

McGuire (1977) reported the continued use of a multiple regression formula first developed at the University of Mississippi School of Medicine, at Jackson, Mississippi, in which he utilized the applicant's overall GPA, the GPA of required science courses, and the science and quantitative ability subtest scores from the new MCAT. The new MCAT subscores were given appropriate weights according to their predictive ability based on a multiple regression analysis. The formula was applied to all entering freshman medical students from 1960 to 1963. The author then utilized the

intact formula at the California College of Medicine, University of California, at Irvine during the years 1964 to 1973. The dependent variable was the class standing of all freshman medical students and was found to be statistically significant at both schools. The total sample population was 946 students. All classes had Pearson r correlations that were significant at the .05 level.

McGuire's conclusion was that the utilization of a multiple regression analysis including the aforementioned independent variables gave a reliable predictor of first year performance in medical school, even when the sample population and the schools differ significantly.

McGuire (1980) evaluated the predictive ability of the new MCAT scores in the same multiple regression predictive equation previously reported in correlation with standings at the end of the freshman year in medical school at the California College of Medicine, University of California, at Irvine. The author found that there was statistical significance at the .0001 level; however, these results were based on only one class of students. The author then developed a percentile index based on the index score achieved by the applicant when the individual subject's scores were applied to the regression equation. McGuire stated that the admissions committee could determine a cut-off score which could be used to reduce the applicant pool. The utilization of such a regression formula and percentile index would greatly reduce the load of the

admissions committee. At the same time, it would enable the admissions committee to select students who would be predicted to perform well in the first year of medical school.

Milstein, Wilkinson, Burrow, and Kessen (1981) studied a group of applicants who were interviewed and accepted at Yale University School of Medicine, at New Haven, Connecticut, but attended another medical school in a comparison study with a second group of students who were not accepted at Yale but attended the same medical schools as the first group. The measures of performance during medical school included scores on the National Board of Medical Examiners' Parts I and II, as well as evaluations from the dean's office from their respective medical schools.

The authors utilized a "least-squares two-way multivariate analysis of variance (MANOVA)" (p. 79) as their statistical test as well as a two-way analysis of variance (ANOVA). The difference in the two groups was only acceptance or rejection at Yale based on interviews of the subjects. Statistical significance held at the .01 level.

Two conclusions were reached by Milstein et al. (1981): (1) admission committee decisions based on interviews alone may be unreliable or invalid predictors of performance in medical school; and (2) little improvement in accuracy of post-screening decisions by the admissions committee could be expected, even if interviews and deliberations based on

them were highly accurate. The authors also stated that if interviews were to be utilized, the fairest and most effective admissions procedure may be an initial screening with final selection being made by lottery.

Dawson-Saunders and Doolen (1981) utilized a canonical redundancy analysis to evaluate the association between six academic and three biographical preselection characteristics and four measures of clinical competence of two classes of medical students at Southern Illinois University School of Medicine at Springfield. Dawson-Saunders and Doolen chose the canonical redundancy analysis over the traditional uni-variant method. The traditional uni-variant method is commonly utilized in educational research in an attempt to compare the utility of the canonical correlation and redundancy analysis with the traditional methods of statistical testing of the relationships between predictor variables and measures of latter performance.

The study included 143 subjects graduating from Southern Illinois University School of Medicine at Springfield in 1979 and 1980. All of the subjects had taken the old MCAT as part of their application process. The independent variables in the study were year of birth, sex, undergraduate background (pre-med or not), new MCAT scores (general information, quantitative ability, verbal ability, science), and GPA (science, non-science). The results revealed that the correlations were not significant. The non-science GPA was the only variable significantly

correlated with all clinical measures at the .01 significance level. The MCAT Science and Quantitative scores were correlated only with clinical sophistication and cognitive knowledge. Science GPA also correlated with clinical sophistication and cognitive knowledge variables at the .001 significance level as well as communication skills at the .05 significance level.

The results reported were generally consistent with those of other reported attempts to predict clinical performance with the exception of a strong correlation of non-science GPA with both clinical measures. The redundancy analysis did not prove to be statistically superior to multiple regression analysis for the prediction utilized by other researchers. The canonical redundancy analysis was, however, useful in the evaluation of the overall relationship between the two sets of variables.

Kress and Dogon (1981), while at Harvard School of Dental Medicine, at Boston, Massachusetts, conducted a study of pre-admission predictor variables and dental school performance utilizing 131 students from nine successive classes at Harvard School of Dental Medicine. Kress and Dogon identified high school rank, Scholastic Aptitude Test verbal and quantitative scores, selectivity of undergraduate college, college GPA, Dental Admission Test (DAT) Academic score, and Perceptual Motor Abilities Test (PAT) averages, as their independent variables. They identified their dependent variables as science GPA, oral examination scores,

and scores on the dental National Board Examinations Parts I and II.

Kress and Dogon were able to calculate correlation coefficients between each predictor and each performance measure; however, only the Dental Admissions Test academic average was statistically significant when it was correlated with the dental National Board Examinations Parts I and II at the significance levels of .05 and .009, respectively. The authors were not disturbed by these results since they interpreted them as representing the apparent lack of predictor power due to the "restricted range of values on either predictor or outcome scores or both" (p. 209). They noted that the range of scores on the predictors was most severely accentuated when the distribution of scores had been truncated at the high end of the range due to the types of students with which they were dealing. They also stated that if students with predictor scores had lower scores than the average students in the study, then the predictors would hold much more significance.

The number of educational research papers conducted by the PA profession are relatively few when compared with other medical professions. The following represented those studies most significant in the topic area as well as references to the previously mentioned conversations with PA educators from the southeast and midwest United States.

Pharris (1974) at Bowman Gray School of Medicine, Wake Forest University at Winston-Salem, North Carolina, reported

at the Second National Conference for New Health Practitioners held at New Orleans, Louisiana, the use of a multiple regression prediction equation for predicting successful completion of the PA Program at Bowman Gray School of Medicine. He selected two criteria to relate: high success in the didactic phase and high ratings by the clinical instructors. The independent variables were Scholastic Aptitude Test scores (verbal and mathematics), General Clerical Test (clerical, verbal, and numerical scales), the California Psychological Inventory (18 scales), the Thurstone Temperament Schedule (7 scales), the Otis Self-Administered Test of Mental Ability, Form B, a rating of past medical experience (weighted), and pre-professional GPA.

Pharris found that on a scale of 4.00, the 38 graduates in the study had a mean difference between predicted score (GPA) and the actual GPA of .305, and a median difference of .300. That is, on a scale of 4.0 for a grade of "A," 3.0 for a grade of "B," and so forth, the predicted score of 3.0 actually varied between 2.5 and 3.5. The greatest error in prediction was .394. The coefficient of multiple correlation was .761 based on the mean of the didactic grades and selected clinical rating. The author found that achieving high ratings in the clinical aspects of the Bowman Gray School of Medicine PA Program did not correlate well with the extent of the student's past medical experience. This finding agreed with that of Crovitz et al. (1973) of Duke

University's PA Program in stating that the SAT was a reliable predictor of performance at the Duke University PA Program. Pharris also found that the Otis Self-Administered Test of Mental Ability did not correlate well with ratings in the clinical setting. The clinical setting was considered to be the more significant of the two criteria selected for which no correlation was found.

Pharris also found that one could predict high grades in the didactic phase of their program utilizing a multiple regression analysis of prediction, but that the same was not true for the clinical phase grades. He did not carry his study to the point to which he included the scores on the National Certifying Examination for Physician's Assistants due to the fact that the first examination was not offered until 1973.

Pharris (1982), in private correspondence and telephone conversations with this researcher, reported that the original equation first conceived in 1973 still holds true even with the changes in the curriculum at Bowman Gray School of Medicine P.A. Program since that time. He also stated that he still had not tested his equation against the scores on the National Certifying Examination.

Crovitz, Huse, and Lewis (1973) undertook a study while at Duke University at Durham, North Carolina, to study the hypothesis that Scholastic Aptitude Tests, the Minnesota Multiphasic Personality Inventory, and prior health care experience would be accurate predictors of completion of the

Duke University PA Program. They were in hopes that their study would assist other PA Programs establish selection criteria. The study encompassed seven graduating classes from Duke, the first PA Program in the United States. Six members of the faculty independently rated students, followed by a consensus conference. One hundred and thirty-six students were followed throughout their didactic and clinical phases of the program to the final determination (completion of the program). The ratings were compared to their SAT's, MMPI, and the amount of previous health care experience.

The authors found that the MMPI and the amount of prior health care experience were not reliable predictors of performance at the Duke University PA Program. They were, however, able to show that achievement tests, as indicated by the Scholastic Aptitude Tests, were the most reliable predictors of successful completion of their program. Seventy percent of the students identified as poor students on the basis of their Scholastic Aptitude Test scores alone were rated as average or excellent by the faculty; 50% were predicted to be excellent students and were rated as such at the end of their training period. The efficiency of the Scholastic Aptitude Tests as a predictor at the Duke University PA Program may reflect the heavy academic design of the training program or may indicate a need for intellectual achievement as a prerequisite for entry to the PA profession.

Perry (1977), while at Johns Hopkins University School of Medicine at Baltimore, Maryland, analyzed the job performance of 939 PA's utilizing a self-rating scale compared to a rating scale completed by the employer. The study indicated that three-quarters of the employers were very satisfied with the performance of their PA, and the same portion of employers would hire the same PA again.

The author utilized a multiple regression analysis to assess the effects of seven background characteristics and three environmental characteristics as the independent variables and three measures of job performance as the dependent variables. He found that there was significance at the .001 level when regression coefficients such as age, sex, interpersonal competence, program attended, academic performance, and practice speciality were all included into the regression equation.

Perry's conclusions stated that graduation from a military PA Program appeared to have a beneficial effect upon job performance while performance during training had little effect upon job performance. He also stated that the amount of education and medical experience prior to beginning PA training did not affect job performance.

Miller and Estep (1978), at the Medical College of Georgia at Augusta, attempted to utilize performance of PA students in the pediatric clinical rotation as a predictor of successful completion of their PA Program. They utilized biographical and achievement data of 45 PA students in their

second year of training, including age, gender, marital status, previous health care experience, Scholastic Aptitude Test verbal, Scholastic Aptitude Test math, undergraduate science and math GPA, overall GPA, and basic science GPA as the independent variables and a criterion (physician-made test on pediatrics rotation) as the dependent variable on which to build their equation of prediction.

The authors found that marital status, previous experience, science GPA, basic science GPA, and Scholastic Aptitude Test, verbal, contributed significantly to the Multiple correlation at the .05 level. They found that the remaining variables did not contribute significantly to their equation. Their conclusions were that only the Scholastic Aptitude Test scores could be utilized as reliable predictors of success, but that this was only marginally effective. They also found that previous health care experience did not play a part in predicting success in their program. They did find, however, that marital status combined with Scholastic Aptitude Test scores was a good predictor of scores on the criterion.

Ladson and Major (1978) evaluated 122 students in the first five classes of the Physician's Assistant Program at Hahnemann Medical College at Philadelphia, Pennsylvania, in an attempt to correlate seven characteristics of these classes with actual performance in the program. The characteristics consisted of four variables as moderator variables and three dependent variables. The control variable was

graduation from the program while the multiple moderator variables were age, sex, college education, and prior medical experience. The three dependent variables were didactic GPA, clinical GPA, and cumulative GPA. The authors carried out a multiple regression utilizing Pearson Product-Moment Correlation Coefficients.

The findings that were statistically significant were: didactic GPA and age at the .05 level; clinical GPA and college education at the .01 level; college education and didactic GPA at the .001 level; and cumulative GPA and college education at the .001 level.

Since college education correlated with all three dependent variables in the study, it must be assumed that college education is a significant variable for selecting students. Prior medical experience had a negative correlation with all three GPA's. The closest of the three GPA's to positive correlation with prior medical experience was the clinical GPA.

Bruhn, Bunce, and Greaser (1978) evaluated predictors of academic success among 98 students in the first five classes at the University of Texas Medical Branch, at Galveston. All students selected for the PA Program were given a battery of tests upon admission that included three personality tests, a test of mental ability, and a reading rate, comprehension, and vocabulary test. The same personality tests were re-administered at the end of the program to determine any changes in personality traits.

Utilizing a multiple regression analysis for exit GPA, the authors found that IQ (by Otis-Lennon Mental Ability Test) correlated at the .002 significance level, while the Nelson-Denny Reading Test correlated with exit GPA at the .05 level. Science GPA correlated with both IQ and reading rate at the .003 and .03 levels, respectively.

Bruhn et al. (1978) agreed with Crovitz, Huse, and Lewis (1973) in stating that there was no significant correlation between personality indices and predicting successful performance in a PA Program.

Middleton (1978), while a doctoral candidate at the University of Houston, Texas, studied 200 individuals from the PA Program at Baylor College of Medicine at Houston, Texas. The author randomly selected 20 students and 20 applicants for each incoming class from 1973 through 1977, studying the effects of three independent variables on 18 dependent variables.

Middleton utilized factor analysis with alpha and principle components to reduce the number of variables. The factors were dependent variables in a multivariate analysis of variance. The author found that only educational orientation, as determined by the Survey of Study Habits and Attitudes, and reading ability, as determined by the Nelson-Denny Reading Test, were significant in determining the mean vectors in matriculation status by the second year. She further found that measures of personality using the Personal Orientation Inventory did not play a significant

role in selection of students. She did not study the relationships of performance as determined by GPA or NCE scores.

Fasser, Director of the Baylor College of Medicine PA Program, at Houston, Texas, in a private conversation with this researcher (1982), stated that he too is evaluating methods of predicting success in PA Programs utilizing correlational studies. He stated that he was utilizing the Nelson-Denny Reading Test, the Otis Self-Administered Test of Mental Ability, the Survey of Study Habits and Attitudes, the Personal Orientation Inventory, pre-professional GPA, Scholastic Aptitude Test scores, and the Allied Health Professionals Admission Test in an attempt to correlate success based on didactic GPA, clinical GPA, and cumulative GPA as measures of success at Baylor College of Medicine. He further stated that he had considered attempting to correlate these same independent variables and the dependent variables mentioned above with the scores on the National Certifying Examination. He also stated that there was the possibility of utilizing science and non-science GPA as well in a multiple regression equation for predicting success at Baylor College of Medicine PA Program.

Fasser is currently compiling and computing the data above in his correlational study of success at Baylor College of Medicine prior to applying the results to data obtained from National Certifying Examination results.

Glazer (1973), Director of the National Commission on Certification of Physician's Assistants, in a speech to the 84th Annual Meeting of the Association of American Medical Colleges held on November 4-8, 1973, at Washington, D.C., reported on a study completed while at the PA Program of Emory University at Atlanta, Georgia, in which he correlated eight independent variables and seven dependent variables as measures of success for the first graduating class at Emory University. Glazer utilized both parametric and non-parametric approaches.

Glazer found that age, previous education alone, and educational level alone did not seem to affect performance in their program. He found that individuals with both prior experience and higher educational levels tended to perform better in the didactic portion of training, but that these factors did not affect clinical training performance. He further stated that Scholastic Aptitude Test scores did not correlate significantly with performance ratings. Tests of Mental Ability and the Scholastic Aptitude Tests correlated well with each other, as was expected. Glazer also stated that the psychological tests utilized showed no affect on performance ratings.

In summary, extrapolating the correlates with statistical significance from the studies reviewed, several independent variables are shown to have strong correlative ability to the ordinary measures of success in a PA Program. The independent variables most often mentioned with

statistical significance are pre-professional GPA, Scholastic Aptitude Test scores, Intelligence Quotient, and reading ability. This researcher found it interesting that several authors found no significant correlation between prior medical experience and performance, especially since the PA profession was designed to take advantage of a large manpower section of young men newly returned from the Viet Nam conflict. Also interesting to find was that there was no significance attributed to age or sex.

The selection of quality students and the prediction of success is not peculiar to the PA profession as was demonstrated in the multitude of studies representing the various medically related fields mentioned above.

As previously mentioned, conversations with PA Program directors revealed common concerns: How does the PA profession best select its students? What correlations can we apply to our applicants' formal application which will give us a better understanding of which applicants will become successful as determired by the National Commission on Certification of Physician's Assistants' National Certifying Examination? How do we as a profession assure that the profession sustains itself as a viable member of the community of medical professions? Only through the careful selection of qualified applicants will we be able to maintain our place within the community.

The concern for selecting qualified applicants is further heightened by this researcher's association with the

PA profession, first as applicant, student, and graduate, and now as a faculty member at the Medical College of Georgia at Augusta, Georgia. Because the PA profession is relatively young, it is of paramount importance that a significant study be undertaken to identify those variables which correlate well with the scores on the National Certifying Examination which may then be applied to predictive use for the assistance of the selection of students. The identification of these variables was the first step in the application of these variables to an equation which may assist in the above quest for successful students.

The key point in Glazer's speech (1973) was that there needs to be many more sophisticated studies conducted, especially those which would consider "post graduation data in order to insure that we select the best PA's and not only those candidates most likely to complete our program."

CHAPTER III

PLANNING AND CONDUCTING THE STUDY

The research hypothesis and its corresponding null were as follows:

H_1: There is a significant relationship between the independent variables (SCGPA, NSCGPA, OAGPA, SATM, and SATV) and the dependent variables (MCQ, PMPDG, PMPMT, CSP, and COMP).

H_0: There is no significant relationship between the independent variables (SCGPA, NSCGPA, OAGPA, SATM, and SATV) and the dependent variables (MCQ, PMPDG, PMPMT, CSP, and COMP).

Identification of Variables

Independent Variables - Predictors

Science Grade Point Average (SCGPA): Pre-professional grade point average in natural and applied sciences

Non-Science Grade Point Average (NSCGPA): Pre-professional grade point average in all subjects not natural or applied sciences.

Overall Grade Point Average (OAGPA): Pre-professional grade point average in all subjects.

Scholastic Aptitude Test Verbal scores (SATV): Scores attained on the Scholastic Aptitude Test, Verbal subscore.

Scholastic Aptitude Test Math scores (SATM): Scores

attained on the Scholastic Aptitude Test, Math subscore.

Dependent Variables - Scores on the NCE

Multiple Choice Questions (MCQ): Questions on medically related sciences.

Patient Management Problems - Data Gathering (PMPDG): Questions on gathering historical and physical examination situations.

Patient Management Problems - Management and Therapy (PMPMT): Questions on situations for management and therapy strategy.

Clinical Skills Problems (CSP): A situational problem in physical examination skills.

Composite (COMP): Represents a score for the entire examination according to the formula:

$$\frac{2MCQ + PMPDG + PMPMT + CSP}{5}$$

Operational Definitions

Independent Variables

Science Grade Point Average (SCGPA): All grades in natural or applied sciences multiplied by the appropriate number of quality points, divided by the total number of hours attempted at the collegiate level from all colleges attended and accepted for transfer. Natural and applied sciences include such topics as biology, chemistry, physics, botony, geology, mathematics,

anatomy, physiology, microbiology, neuroanatomy, biochemistry, and kinesiology.

Non-Science Grade Point Average (NSCGPA): All grades in the topics not included as sciences multiplied by the appropriate number of quality points, divided by the total number of hours attempted at the collegiate level from all colleges attended and accepted for transfer. Non-Science topics include such topics as English and other languages, history, political science, humanities, behavioral sciences, and other course work generally not accepted as Science courses (military science, physical education, and education).

Overall Grade Point Average (OAGPA): All grades from courses attempted at the collegiate level multiplied by the appropriate number of quality points, divided by the total number of course hours in all courses attempted at the collegiate level and accepted for transfer.

Scholastic Aptitude Test Scores (Mathematics) (SATM): The score attained on the Scholastic Aptitude Test, mathematics section.

Scholastic Aptitude Test Scores (Verbal) (SATV): The score attained on the Scholastic Aptitude Test, verbal section.

Dependent Variables

Multiple Choice Questions (MCQ) Scores: Scores attained on the NCE, Multiple Choice Question section, which covers the following domains: anatomy, physiology, microbiology, chemistry, physics, histology, internal medicine, obstetrics and gynecology, pediatrics, general surgery, thoracic surgery, orthopedics, ophthalmology, dermatology, pharmacology, cardiology, counseling, and medical terminology, to name a few.

Patient Management Problem - Data Gathering (PMPDG) Scores: Scores attained on the NCE, Patient Management Problem - Data Gathering section, which covers the following domains: history and physical examination information gathering techniques; interpretation of laboratory, radiology, electrocardiology, and special function examinations, to name a few.

Patient Management Problems - Management/Therapy (PMPMT) Scores: Scores attained on the NCE, Patient Management Problems - Management and Therapy section, which covers the following domains: internal medicine, surgery, orthopedics, pediatrics, obstetrics and gynecology, psychiatry, cardiology, pharmacology, dermatology, thoracic surgery, counseling, laboratory data, radiology

data, electrocardiology data, and data from specific function tests, to name a few.

Clinical Skills Problems (CSP) Scores: Scores attained on the NCE, Clinical Skills Problems (physical examination) section.

Composite (COMP) Scores: The composite scores attained on the NCE which is based on the formula:

$$\frac{2(MCQ) + PMPDG + PMPMT + CSP}{5}$$

Control Variable: Graduation from the Physician's Assistant Department, School of Allied Health, Medical College of Georgia, Augusta, Georgia, in classes 1976-1980.

Primary Care Physician's Assistant: An individual trained through academic and practical experiences who assists the Physician in the care of his patients.

Population and Sample

The population for the study consisted of graduate Physician's Assistants from the Physician's Assistant Department, School of Allied Health, Medical College of Georgia, at Augusta, Georgia, in the classes from 1976 to 1980. Most of these individuals took the National Certifying Examination for Primary Care Physician's Assistants as offered by the National Commission on Certification of Physician's Assistants after graduation. Each class graduated an average of 23 students per year.

The total sample pool size was 114 individuals; however complete data were available for only 59 subjects. These 59 graduates constituted the subjects of this study.

Research Design

The research design utilized was an ex-post facto design, namely the correlation method. The design included correlations between five independent variables and five dependent variables. Statistical analysis was based on the Pearson Product-Moment Correlation utilizing score data on all measurements.

The confidence level chosen for rejecting the null hypothesis was set at the .05 level. Data were collected and a computer was utilized to compute the correlations.

Instrumentation

Data Collection. The data necessary for this study were extracted from former students' files of the Physician's Assistant Department, School of Allied Health, Medical College of Georgia, with permission from the Director of the Physician's Assistant Department and the Dean of the School of Allied Health.

Reliability of the Instruments. The Scholastic Aptitude Test subscores were well established standardized test scores, with high reliability and validity coefficients when used to predict college performance in the freshman year. A conversation with David L. Glazer, Executive Director of NCCPA, in May 1982, revealed that the NCE had undergone internal examinations for validity and

reliability. Glazer stated that the examination had face validity, but that there was no hard data concerning construct validity. He further stated that there had been an internal item analysis of each item on the examination with results revealing a high discrimination index and index of difficulty, while the composite reliability for the entire examination was .94. The NCE is the instrument accepted by the Physician's Assistant profession, as well as by many State Boards of Medical Examiners, as the single instrument for testing entry level professional performance of Physician's Assistants. Since this instrument had been widely accepted by the profession and others, this researcher used the scores as though they were reliable measures.

Analysis of Data

All data were kept confidential by assigning each subject a number and recording that number in a log. After all data had been collected and analyzed, the identification log was destroyed.

The data from all 59 subjects were entered into the CYBER computer at the University of Georgia for analysis.

Assumptions and Limitations of the Study

Assumptions

1. The content and construct validity of the National Certifying Examination for Primary Care Physician's Assistants, as administered by the National

Commission on Certification of Physician's Assistants, is valid.

2. The reliability of the National Certifying Examination for Primary Care Physician's Assistants, as administered by the National Commission on Certification of Physician's Assistants, is accurate as stated by Glazer.

Limitations

1. The generalization of this study was limited by the use of data from only one Physician's Assistant Training Program.
2. The subjects' academic background and the number of years in college training were quite varied when entering the PA Program, thus limiting the generalizability of the findings.
4. No data was available from 55 of the 114 graduates; this may have distorted the outcome of the statistical analysis.

CHAPTER IV

RESULTS

Descriptive Statistics

A summary of the descriptive statistics of the independent and dependent variables is shown in Table I on the next page.

Correlation Matrix

The results of the correlations among the subcategories of the independent and dependent variables are presented in Appendix A.

The relationships between the independent and dependent variables are shown in Table II.

Discussion

The correlations between the independent and dependent variables did not show particular significance as a whole. There were only seven significant correlations found when the computerized data were analyzed. The single most significant independent variable was SATV with three correlations found to be significant. The next most significant independent variables was SATM with two correlations found to be significant. NSCGPA and OAGPA revealed one significant correlation each, while SCGPA did not reveal any significant correlations when applied against the five dependent variables.

TABLE I

DESCRIPTIVE STATISTICS

VARIABLE	N	MEAN	SD	SE_m	VARIANCE	MINIMUM SCORE	MAXIMUM SCORE
SCGPA	59	2.946	.453	.059	.205	1.970	3.840[1]
NSCGPA	59	3.148	.509	.066	.259	1.730	3.950[1]
OAGPA	59	3.045	.404	.053	.163	2.000	3.810[1]
SATM	59	527.136	81.727	10.640	6679.361	370.000	720.000[2]
SATV	59	507.441	84.667	11.023	7168.527	350.000	730.000[2]
MCQ	59	482.797	96.118	12.514	9238.682	224.000	693.000[3]
PMPDG	59	454.254	102.641	13.363	10535.158	169.000	628.000[3]
PMPMT	59	457.492	93.719	12.201	8783.289	180.000	633.000[3]
CSP	59	465.305	65.719	8.570	4333.181	202.000	500.000[4]
COMP	59	468.136	69.753	9.081	4865.430	320.000	600.000[5]

[1] = 4.000 maximum possible

[2] = 800.00 maximum possible

[3] = 700.000 maximum possible

[4] = 500.000 maximum possible

[5] = 660.000 maximum possible

TABLE II

INDEPENDENT/DEPENDENT VARIABLES

RELATIONSHIP

	SCGPA	NSCGPA	OAGPA	SATM	SATV
MCQ	.1334	.0297	.1165	.2792	.3668
	59	59	59	59	59
	.157	.412	.190	.016*	.002*
PMPDG	.1556	.2571	.2778	.2131	.2517
	59	59	59	59	59
	.120	.025*	.017*	.053	.027*
PMPMT	.1200	.0882	.1436	.1417	.1935
	59	59	59	59	59
	.183	.253	.139	.142	.071
CSP	-.0712	-.1099	-.0984	-.0393	.0181
	59	59	59	59	59
	.296	.204	.229	.384	.446
COMP	.1360	.0951	.1648	.2492	.3334
	59	59	59	59	59
	.152	.237	.106	.028*	.005*

Summary

Since there is no single independent variable which correlated significantly with all five dependent variables, the null hypothesis was upheld; that is: "There is no significant relationship between the independent and dependent variables."

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The PA Profession has progressed to the point where one may well expect to find significant research into the area of identifying those variables which correlate with the professional entry level performance. To date this researcher has been unable to find any study of those independent variables. This research was an attempt to identify which, if any, of the more commonly thought of variables utilized to assess PA applicants correlate with NCE scores. If significant variables could be identified, then it might be possible to construct predictive equations based on the data gathered.

The literature search revealed no significant studies in the field. Personal conversations with the directors of four PA Programs confirm the suspicion of this researcher that there was a keen interest in the subject, but that they, too, have been unable to identify those variables which might correlate well with NCE scores. These same directors continue to dwell on the same questions as this researcher: How does the PA profession best select its students? What correlates can we apply to our applicants' formal applications which would give us a better understanding of which applicants would become successful as determined by NCE scores?

This researcher chose five independent variables generally utilized by PA Programs to evaluate their applicants and applied them to five dependent variables (scores on the NCE). The subject pool consisted of graduates of the Physician's Assistant Department in the School of Allied Health, Medical College of Georgia, at Augusta, Georgia, from 1976 to 1980. The pool total was 114; however complete data were available on only 59 subjects. The independent variables were: Science Grade Point Average, Non-science Grade Point Average, Overall Grade Point Average, Scholastic Aptitude Test Math scores, and Scholastic Aptitude Test Verbal scores. The dependent variables were scores on the NCE which include: Multiple Choice Questions, Patient Management Problems - Data Gathering, Patient Management Problems - Management and Therapy, Clinical Skills Problems, and Composite. All variables were interval scales allowing for parametric statistical analyses. The Pearson Product-Moment Correlations were carried out between all of the variables.

The results of the statistical analysis revealed that there were strong intra-independent variable correlations, with the exception that SATM did not hold significance with any of the other independent variables. The intra-dependent variables showed an even stronger correlation with all but one correlation holding significance. The smallest correlation coefficient of those holding at the .05 level of confidence was that between MCQ-CSP ($p = .023$). Following

closely behind the MCQ-CSP relationship was that between PMPMT and CSP at .022.

The correlations between the two sets of variables did not show particular significance as a whole. Only seven significant relationships were found. The single most powerful independent variables was SATV with three significant correlations, followed by SATM with two significant correlations. NSCGPA and OAGPA revealed only single significant correlations while SCGPA held no significant relationships.

Since there was no single independent variable which held significance with all of the dependent variables. the null hypothesis was upheld: namely, "There is no significant relationship between the independent and the dependent variables." This researcher found that neither of the sets of independent variables correlated to any significant degree with scores on the NCE. Subsequently, the independent variables could not be utilized to predict future performance with any certainty in the evaluation of applicants to the Physician's Assistant Department at the School of Allied Health, Medical College of Georgia.

This research continues to show that identifying those variables which may be found to be strong correlates of success is a very difficult task. The research brings us no closer to the questions asked in the introductory chapter: "How does the PA profession best select its students?" and "What correlates can we apply to our applicants' formal

application which will give us a better understanding of which applicants will become successful as determined by NCE scores?"

Due to the limited number of variables evaluated, the limited population of the study, and the relatively few significant findings, it would not be advisable to attempt to construct predictive equations for students at the Medical College of Georgia PA Program, nor would it be advisable to attempt to generalize from these results. Once again, the key point of Glazer's speech at the 84th Annual Meeting of the Association of American Medical Colleges (1973) is upheld: The Physician's Assistant profession needs to conduct sophisticated research studies in the area of relationships between pre-professional data and professional performance (NCE scores) to "insure that we select the best PA's and not only those candidates most likely to complete our program."

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APPENDIX A

CORRELATION MATRIX

	SCGPA	NSCGPA	OAGPA	SATM	SATV	MCQ	PMPDG	PMPMT	CSP	COMP
SCGPA										
NSCGPA	.3659 59 .002*									
OAGPA	.8168 59 .001*	.8242 59 .001*								
SATM	.1365 59 .151	.1544 59 .122	.1832 59 .082							
SATV	.1013 59 .223	.3380 59 .004*	.2791 59 .016*	.6099 59 .001*						
MCQ	.1334 59 .157	.0297 59 .412	.1165 59 .190	.2792 59 .016*	.3668 59 .002*					
PMPDG	.1556 59 .120	.2571 59 .025*	.2778 59 .017*	.2131 59 .053	.2517 59 .027*	.4872 59 .001*				
PMPMT	.1200 59 .183	.0882 59 .253	.1436 59 .139	.1417 59 .142	.1935 59 .071	.5672 59 .001*	.4369 59 .001*			
CSP	-.0712 59 .296	-.1099 59 .204	-.0984 59 .229	-.0393 59 .384	.0181 59 .446	.2616 59 .023*	.1775 59 .089	.2631 59 .022*		
COMP	.1360 59 .152	.0951 59 .237	.1648 59 .106	.2492 59 .028*	.3334 59 .005*	.8975 59 .001*	.7144 59 .001*	.7617 59 .001*	.4607 59 .001*	

correlation
number of subjects
significance

* = p .05 or better
df = 57